In the claims:

This listing of the claims replaces all prior versions in the application.

1. (Currently Amended) A gamma ray detector assembly for placement in a logging tool in a borehole, the detector assembly comprising:

a first gamma ray detector elongated along an axis and defining a void extending along the axis;

a second gamma ray detector conforming to at least a portion of the void, wherein the first and second gamma ray detectors are configured to be positioned in the borehole and to detect gamma ray events; and

a signal processor configured to receive signals from the first and second gamma ray detectors and to graph the gamma ray events from the first and second gamma ray detectors as a function of energy in a two-dimensional representational plot to determine ~~the~~ a rate of coincidence between a first event and a second event, wherein the first event and the second event sum to a predetermined energy between about 1.5 MeV and11 MeV.

2. (Original) The detector assembly of Claim 1, further comprising a substantially waterproof housing enclosing the first gamma ray detector and the second gamma ray detector.

3. (Original) The detector assembly of Claim 1, wherein the first gamma ray detector and the second gamma ray detector are scintillation detectors.

4. (Original) The detector assembly of Claim 1, wherein the first and second gamma ray detectors are cylindrical, the first gamma ray detector forms an outer cylinder and the second gamma ray detector forms an inner cylinder.

5. (Original) The detector assembly of Claim 1, wherein the first gamma ray detector has a variable thickness around the perimeter of the second gamma ray detector.

6. (Original) The detector assembly of Claim 1, further comprising a shielding material on an end of the first gamma ray detector and a radioactive neutron source on a side of the shielding material facing away from the first gamma ray detector, wherein the radioactive source is configured to irradiate material in the borehole.

7. (Original) The detector assembly of Claim 3, further comprising a first photomultiplier tube in communication with the first gamma ray detector and a second photomultiplier tube in communication with the second gamma ray detector.

8. (Canceled).

9. (Currently Amended) The detector assembly of Claim [[8]] 1, wherein the signal processor is configured to detect a first event in one of the first gamma ray detector and the second gamma ray detectors and to determine if a second event is detected in coincidence with the first event in the other of the first and the second gamma ray detectors.

10. (Currently Amended) The detector assembly of Claim [[8]] 1, wherein the signal processor is configured to determine the rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors.

11. (Currently Amended) The detector assembly of Claim [[8]] 1, wherein the signal processor is configured to determine the rate of coincidence between an event and two annihilation photons.

12.-13. (Canceled).

14. (Currently Amended) The detector assembly of Claim [[8]] 1, wherein the signal processor is further configured to determine a ratio of oxygen and carbon based on events in the first and second gamma ray detectors.

15. (Currently Amended) A method of detecting gamma rays in a borehole, the method comprising:

placing a first gamma ray detector and a second gamma ray detector into the borehole, wherein the first gamma ray detector is elongated along an axis and defines a void extending along the axis and the second gamma ray detector conforms to at least a portion of the void;

detecting a first event in one of the first gamma ray detector and the second gamma ray detector;

graphing the gamma ray events from the first and second gamma ray detectors as a function of energy to provide data in a two-dimensional representational plot;

determining whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detector; and

storing and/or providing to a user an indication of at least a portion of the data from the two-dimensional plot and/or determining step;

wherein determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between a first event and a second event, and the first event and the second event sum to a predetermined energy between about 1.5 MeV and about 11 MeV.

16. (Original) The method of Claim 15, wherein the first and second gamma ray detectors are cylindrical, wherein the first gamma ray detector forms an outer cylinder and the second gamma ray detector forms an inner cylinder.

17. (Original) The method of Claim 15, wherein the first gamma ray detector has a thickness that varies around the perimeter of the second gamma ray detector.

18. (Original) The method of Claim 15, further comprising: positioning a shielding material on an end of the first gamma ray detector; and positioning a radioactive source on a side of the shielding material facing away from the first gamma ray detector; and irradiating material in the borehole with the radioactive source.

19. (Original) The method of Claim 15, further comprising providing a first photomultiplier tube in communication with the first gamma ray detector and a second photomultiplier tube in communication with the second gamma ray detector.

20. (Original) The method of Claim 15, wherein determining whether a second event is detected in coincidence with the first event includes determining a rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors.

21. (Original) The method of Claim 15, wherein determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between an event and two annihilation photons.

22.-23. (Canceled)

24. (Original) The method of Claim 15, further comprising determining a ratio of oxygen and carbon based on events in the first and second gamma ray detectors.

25. (Currently Amended) A method of detecting gamma rays in a borehole comprising:

placing a first gamma ray detector and a second gamma ray detector into the borehole;

detecting a first event in one of the first gamma ray detector and the second gamma ray detectors; and

graphing the gamma ray events from the first and second gamma ray detectors as a function of energy in a two-dimensional representational plot;

determining-whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detectors[[,]]; and

storing and/or providing to a user an indication of at least a portion of the data from the two-dimensional plot and/or determining step, wherein the first event and the second event sum to a predetermined energy between about 1.5 MeV and about 11 MeV.

26. (New) A method of detecting gamma rays in a borehole, the method comprising:

receiving gamma ray events emitted from materials adjacent a borehole, wherein the gamma ray events are detected by at least two gamma ray detectors; and

graphing gamma ray events from the at least two gamma ray detectors as a function of energy to provide data in a two-dimensional representational plot to determine whether two or more events are in coincidence with each other; and

storing and/or providing to a user an indication of at least a portion of the data from the two-dimensional plot.